DOCUMENT RESUME

ED 079 106 SE 016 433

TITLE	Environmental Ecological Education Program, Interim Evaluation Report July 1, 1971 - June 30, 1972.
INSTITUTION	Parkway School District, Chesterfield, Mo.
SPONS AGENCY	Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
PUB DATE	Sep 72
NOTE	91p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Ecology; Educational Programs; *Environmental Education; *Evaluation; Handicapped Students; Inservice Teacher Education; Intermediate Grades; Outdoor Education; *Projects; *Reports; Resident Camp Programs; Supplementary Educational Centers
IDENTIFIERS	ESEA Title III

ABSTRACT

The project involved an inservice workshop for teachers, a series of experiences for intermediate elementary students in an outdoor environmental interpretation center, a one-week outdoor resident camp program for students in grades five and six, and a six-week summer environmental/ecological program for mentally retarded and orthopedically handicapped students. Program objectives are defined together with a summary of their respective activities and evaluations. A brief review is also given of the dissemination activities emanating from the project. The appendices provide several survey instruments and questionnaires, including results, which were used to evaluate attitudes and skills achieved by teachers and students in the various aspects of the project. Staff reports, parent letters, and sample of student work conclude the report. This work was prepared under an ESEA Title III contract. (BL)

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ELEMENTARY AND SECONDARY EDUCATION ACT

TITLE III, P. L. 89-10, AS AMENDED

Project Number

35-71-15-I

ENVIRONMENTAL ECOLOGICAL EDUCATION PROGRAM

Interim Evaluation Report

July 1, 1971 - June 30, 1972

Submitted by

Parkway School District
455 North Woods Mill Road
Chesterfield, Missouri 63017

Submitted: September, 1972

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TITLE III, ESEA

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OBJECTIVES-ACTIVITIES-EVALUATION

Objective I

a. As a result of the first of six weeks of in-service workshop, July 1 - August 12, 1971, seventy-two elementary teachers, grades K-6, four teachers from each of the seventeen public schools, two from one non-public school, and two from the Special School District will show significant knowledge gain (minimum of 80% correct responses relative to knowledge will be scored) on post test.

b. Activities:

1. The in-service workshop followed guidelines outlined in "In-service Education Models for Schools", the results of a former Title I, funded project.

2. Included among the elementary teachers was thirteen who participated in a Title V, summer 1970, funded project "Development of Lead Teachers in ESS". Their "lead teacher" position in the science program continued into the EEE program

3. The workshop operated five days per week for six hours per day.

4. Each teacher received a general indoctrination to the parameters and philosophical perspective of the project.

5. From an EEE resource team from Southern Illinois University, each teacher received instruction in basic ecological concepts, the application of ecological concepts to environmental management, the development of value constructs concerning resources and their management, the preparation and implementation of outdoor activities to develop environmental concepts, the means of surveying and inventorying resources potentials within the community, and the development of a continuing curricular program in the environmental sciences for all grade levels.

6. Teachers received information of the environmental interest of local agencies through the visitation of the following local consultants:

Jack Woodhead - Educational Consultant Missouri Conservation Committee

Wayne Kennedy - Director of Parks and Recreation, St. Louis County

Dave Gaudy - Superintendent, Missouri Botanical Garden Arboretum

7. Teachers were instructed in use of "The General Teaching Model", developed by David T. Miles and Roger E. Robinson.

8. Five teachers of private and parochial schools were involved to the fullest extent possible as allowed under Missouri law and as by their response to invitation to participate.

C. Evaluation:

Based on this objective it was our problem to determine whether or not the acquisition of conceptual knowledge by the workshop participants was indeed affected by that workshop, whether it was significant and whether or not the gain was up to a miniumum of 80% correct responses.

An instrument was developed which included cognitive demands in seven areas: Ecology objective (E) 10 points, General Teaching Model Objective (G) 5 points, Writing Behavioral Objective (W) 1 point, Identifying Performance Objective (I) 5 points, Writing Performance Terms (PT) 10 points, Drawing a Food Chain (FC) 1 point, Listing Envioronmental Activities (L) 10 points. None of these can be compared with each other. All data must be considered separately except for the 80% minimum correct responses.

Pre and post scores were compared and a related "t" test of significance of difference was made on each catagory score and total score.

The following is a summary of the test results.

Test catagory	Pre-test	Post-test	t-test*
E	Mean 5.58	Mean 8.12	8.8806
G	Mean 3.66	Mean 4.98	6.8536
W	Mean .24	Mean .78	7.5843
I	Mean 2.64	Mean 4.04	6.5479
PT	Mean 3.5	Mean 9.38	11.118
FC	Mean .36	Mean .92	7.3248
L	Mean 5.88	Mean 9.28	6.5408
Total Test	Mean 21.1	Mean 37.12	14.9189

*Using .05 level of significance the critical value for "t" is 1.677

Assuming the instrument was valid, it is not difficult to conclude from this data that the conceptual knowledge increase was significant.

Examination of the percent data shows that although the mean percent of correct responses obtained on post test is 88.38%, subjects #2,14,23,28,39, and 44 failed to reach the minimum 80% correct responses as stated - the objective.

The instrument and data for the above evaluation may be seen in appendix A.

Objective II

a. As a result of the first of six weeks of in-service workshop, July 1 - August 12, 1971, seventy-two elementary teachers, grades K-6, four teachers from each of the seventeen public schools, two from one non-public school, and two from the Special School District will show a gain in acquisition of acceptable attitudes toward EEE topics from pre to post-test. The "acceptable attitudes" to be determined by EEE consultant team.

b. Activities:

See Activities in Objective I.

c. Evaluation:

Based on this objective it was our problem to determine whether or not there was a gain in the acquisition of acceptable attitude by the workshop participants as a result of that workshop as determined by the EEE consultant team.

An instrument was designed similar to "Attitude Cluster, Survey on Environmental Problems" developed by Clifford E. Knapp. This instrument contains seventy-two statements twelve each on six selected problems of the environment. These are air, water, wildlife, vegetation, soil and land use. To react to each statement the participants were given the option of checking on a five rating scale, highly favorable, favorable, undecided, unfavorable, and highly unfavorable. The placing of the items on the continuun provides the participant an opportunity to indicate the extent to which he favors or disfavors an item. By definition, an attitude indicates the degree of positive or negative affect associated with a topic.

It was determined by the Environmental Education Resource team that a shift toward the hypothetical response from pre to post-test would be an indication of gain in acceptable attitudes toward EEE topics.

The following is a summary of the test results from the fifty participants who completed both the pre and post-test.

		Hypothetical		
Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable
350	700	1500	700	350
		Pre-test		
156	1714	1287	443	
		Post-Test		
177	1347	1386	653	37

c. Evaluation (cont.)

As noted in the above data there was a shift toward the hypothetical from pre to post-test although deviation from the hypothetical remains great. It would appear that at the beginning of the workshop, participants were eager to solve environmental problems without sufficient thought of the consequences. But during the workshop, attitudes were changed as presentations and activities stimulated more rational thinking and participants realized that all possible actions are not positive.

Further evaluation could have been accomplished if values had been assigned and scores reduced to standard scores with respect to each variate, for the sample of persons concerned as with a Q technique. In addition, a "t" test of significance of difference could have been made.

Although the data above meets the needs of the objective the staff is planning a more detailed evaluation of the second fuding year.

A copy of the instrument is located in appendix B.

Objective III

a. As a result of the first of six weeks of in-service workshop, July 1 - August 12, 1971, seventy-two elementary teachers, grades K-6, four teachers from each of the seventeen public schools, two from one non-public school, and two from the Special School District will show the acquisition of skills gained through the use of teaching models, as those contained in Appendix D, by successfully completing eight of nine objectives as stated by the project director.

b. Activities:

See Objective I.

c. Evaluation:

After the instructional sequence of Objective I and II, the participant will be able to successfully demonstrate acquired skills by completing any eight of the following nine activities.

1. Write his own definitions of EEE.

2. Analyze in writing two major viewpoints involved with the issue in the Parkway School District density housing zoning.

3. State his position on the zoning issue in a letter of at least 60 words.

4. List and briefly describe three environmental problems considered by the participant to be most important from the standpoint of the community, the state, the nation, and the world. (Be as specific as possible for each of the four standpoints.)

5. List at least ten of the best sources of useful instructional materials written for the teaching of EEE at a grade level of your choice.

6. Design at least nine learning activities for children or youth of a specified grade level related to the environmental problems listed in #4. (Select four indoor activities and five outdoor activities or five indoor activities and four outdoor activities.) Follow the models provided.

7. Write, for evaluative purposes, behavioral objectives for each activity listed in #6.

8. List at least three ecological implications involved in a given environmental problem.

9. Develop a teaching model and test it with other participants.

All participants completed the above requirement to the satisfaction of the project staff. A sample may be found in appendix C.

Objective IV

a. As a result of training and experience received during week one of the in-service workshop the seventy-two participating teachers, working in building groups will, during the last five weeks of the workshop, develop a syllabus incorporating an annotated inventory of their individual school and neighborhood sites, identifying all natural or man-made facilities that exist as experimental vehicle for EEE. Also included will be a specific identification of those teaching strategies that can be used with reference to each facility or resource. Furthermore generally applicable units dealing with specific environmental topics will be prepared. Said units and activities will incorporate behaviorally stated objectives that reflect cognitive knowledge and skill dimensions as well as affective dimensions where appropriate.

b. Activities:

1. Teachers worked as a group at their own building sites, with the aid of assigned project staff member, produced a site and neighborhood inventory.

2. Teachers were given field trips to a variety of Parkway area sites.

3. Teachers given the opportunity to select from a predetermined list of specific topics, developed units applicable to all schools. Activities for these units take place on the school site, on a 98 acre LEA owned area which developed into an environmental interpretation center or sites in the St. Louis area, i.e., water treatment plants, sewage disposal plants, Alton Dan and Locks, a particular industry or natural area such as Babler State Park, Missouri Botonical Arboretum, Rockwoods Reservation, etc.

c. Evaluation:

1. The development of a syllabus incorporating an annotated inventory of teaching resources and the completion of 16 interdisciplinary environmental units for grades K-6 demonstrated the acquisition of this objective.

2. Forty-seven letters of request for the Curriculum units were received the first year as a result of persons reviewing the units on display at various conferences or from project reports by project staff.

Objective V

a. As a consequence of teacher preparation, neighborhood site inventories, teacher developed curriculum and other appropriate planning, the twelve thousand (12,000) elementary students, grades K-6, will complete at least 70% of the stated behavioral objectives from each curriculum unit for their grade.

b. Activities:

Activities on which student experiences were based are found among the sixteen units developed by the summer workshop participants.

All activities were structured in behavioral terms to allow students to identify that knowledge and those skills for which they are responsible as well as to permit the instructional staff to pre-and post-test students.

c. Evaluation:

Random sampling from check lists indicating student achievement of each behavioral objective for each unit were taken. From the 100 samples which represented all grades results were as follows:

% students	% of Behavioral Objective completed
14	73
19	80
22	86
17	93
10	100

A sample teacher report is found is appendix D.

Objective VI

a. As a result of experiences in the outdoor environmental interpretation center to be located on 98 acres LEA owned property, intermediate elementary students will demonstrate mastery of at least 80% of the basic skills of field research on their level through the proper use of outdoor laboratory equipment in field problem investigations.

b. Activities:

1. The environmental interpretation center for day use, was inventoried by the project staff who in turn produced a field trip guide and map which was made available to persons in the schools and community.

2. A member of the project staff accompanied teachers and students from his assigned buildings on field trips to the environmental interpretation center. They gave aid in preplanning, directing the field projects, and in follow-up discussions and activities.

3. The project provided mobile laboratory with necessary field laboratory equipment and materials for field problem investigation was utilized.

c. Evaluation:

1. Twenty-seven groups from nine Parkway schools and one nearby district school totaling 2137 students utilized the ~~center~~ and equipment from the mobile laboratory. Adults from the nearby subdivision reported using the trails as evening walkways. This is evidence of acceptance and usage of area.

2. Random sampling of teacher reports indicate students are acquiring at least 80% of the basic skills of field research named on the project check list.

A teacher report may be seen in appendix E.

Objective VII

a. As a result of experiences in the outdoor environmental interpretation center to be located on 98 acres of LEA owned property, intermediate elementary students will demonstrate more interest and appreciation then previously indicated for aesthetic and natural surroundings, by added expression of their awareness and perceptions of the environment through the creative media of art, music, and writing.

b. Activities:

See Activities under Objective VI.

c. Evaluation:

Through creative behaviors, students have demonstrated their increased appreciation of aesthetic natural aspects of the environmental interpretation center in creative art, music and writing following field trips by using aspects of nature as the subject for paintings, poems and compositions. Primary students respond through letter writing. See appendix F for a copy of a page taken from an elementary school newsletter and two letters from 2nd grade students.

Objective VIII

a. Having experienced a one five day week outdoor resident camp program all 2,500 - 5th and/or 6th grade students should be able to demonstrate and orally relate to peer groups, teachers, parents, and other adults, their improved ability to (1) learn to live and work together as a group, (2) work democratically and still meet individual needs, (3) understand and appreciate one another's points of view, (4) understand the differing roles which members assume, (5) participate as a member of a group and in addition through teacher constructed tests will measure significantly higher the application of knowledge acquired through outdoor situations as related to classroom subjects.

b. Activities:

1. 1430 students either at the beginning or the end of the sixth grade year, spent one week (Sunday afternoon to Friday afternoon) at a project directed resident camp located at Trout Lodge, Potosie, Missouri.

2. Students were accompanied by their regular teaching staff, high school counselors and a project staff member.

3. Students engaged in curriculum experienced which had been orientated toward outdoor activities. The curriculum unit, developed by project staff are as follows: Limestone Geology, Creative Dramatics, Weather, Water Environment, Archery, Meadow Study, Spillway, Tracks, Arts and Crafts, Cave Study, Water Wheel, Folklore, Economic Geology, Cemetery Study.

c. Evaluation:

1. Based on this objective it was our problem to determine whether or not the social and environmental attitudes were indeed affected by the resident program. An instrument was developed in the form of a rating scale to be completed by teachers of the students immediately before and after that student participated in the resident program. The rating scale produced a numerical score. Out of this group of 1430 participants 100 were selected at random. Pre and post scores were compared and a related "t" test of significance of difference was made. Application of the "t" test of significance of difference yielded a 33.006* on the social attitude and 49.6493* on the environmental attitude.

The following is a summary of the test results.

Test	Pre-Test	Post-Test	t-Test
Social Attitude	Mean 26.64 S.D. 6.24	Mean 70.86 S.D. 14.82	33.006
Environmenal Attitude	Mean 18.19 S.D. 4.31	Mean 74.69 S.D. 10.86	49.649

*Significance beyond .001 level

c. Evaluation (cont.)

It is difficult to draw absolute conclusions from this data in that the valadity for such affective instruments is subject to concern. But in combination with the here-to-fore mentioned teacher rating scales, one can assume at least some confidence in speaking to affective objectives. See appendix G for a copy of the instrument and results.

2. A student evaluative survey to indicate the student's attitude toward the resident program was developed by the project staff and given as a post-test. A discussion of results of 100 random selections follow: (see appendix H for full details).

The positive response to questions one and two by large numbers indicates the broadening of their social experiences beyond the smaller classroom group and that they accepted quite well others with whom they had not associated as much.

The negative affect as shown by 42% - question three may indicate that these students are not ready to work democratically and understand and appreciate one anothers points of view. The question does not allow for an estimate of numbers and we will assume on the basis of answers to one and two that those loosing friendship remain in small numbers.

Answers to question four would indicate the students left camp with a good feeling of accomplishment having acquired many learnings about their environment.

Positive answers to question five reinforces the belief of the project staff that concepts and skills developed during the 16 EEE Units used in the elementary schools lead up to and coagulate with the resident program.

From number six one might conclude the daily routine tasks of cabin cleaning, bed-making, etc. were harsh, but given an opportunity in question 15 to list dislikes about camp, only one person listed cabin clean up and none listed bed making.

Answer to number seven give rise to question of counselor efficiency as bathing, tooth brushing, and clothing change are stressed during counselor orientation.

Number eight and nine would indicate the environment of the resident program is none conducive to good peer and student-adult relationship than that of the traditional school atmosphere.

The answers to number ten were most valuable feedback about the curriculum units. As a result six units have been revised or combined to provide a more interesting academic program.

c. Evaluation (cont.)

Number eleven is another indicator of the curriculum content and points of emphasis in the program. Although a few uses of this knowledge were listed, the listing was not as comprehensive as one might expect from the positive answers.

Student participating in the resident program come from an affluent suburban society so that the less that positive answers in number twelve do not come unexpected.

Answers to questions thirteen, fourteen, fifteen, and sixteen vary with no more than six students listing a similar answer. A complete selection of answers are listed in the appendix H.

The following quote from one student's questionnaire perhaps gives the best summary of all. "Please whom ever gets this I thank all the teachers for giving us a good time and I know you can't please everyone, but I do feel you pleased me. I just loved it."

3. Based on this objective it was our problem to determine whether or not the student would show a gain in specific knowledge as a result of participating in the five day resident program.

   An instrument was designed in the form of an 50 point objective te t based on contest found in the curriculum unit. It was given to students immediately prior and following the resident experience.

   From 100 random samplings results show that no student scored less on the post than on the pre-test and the average pre-test score was 17 compared with an average post-test score of 41.5.

   Further evaluation could have been carried out in the form of a "t" test of significance of difference but it was felt unnecessary to meet the objective at this time.

   A copy of the instrument and results are located in appendix I.

Objective IX

a. As a result of participation in a six week summer environmental ecological education program made available to the seventy-two educable mentally retarded and fifteen orthopedically handicapped students living within the Parkway School District, students will score higher on a standard achievement test at the end of six weeks than shown on a pre-test at the beginning. This testing is in keeping with the policies of the Special School District where these students attend during the academic year.

b. Activities:

1. The EEE program was conducted at the 98 acre LEA owned environmental interpretation center using curriculum materials and activities developed by members of the project staff in cooperation with one teacher from the Special School District. 12 students participated.

2. The mobile laboratory provided equipment to support the activities of participating students.

3. Battery powered personal carriers were utilized to transport orthopedically handicapped students from the mobile laboratory throughout the environmental interpretation center for collecting, and conducting on the spot investigations.

4. Three volunteer high school students were used as aids in moving wheel chair students and supervising small group games and activities.

5. See appendix J for log of activities.

c. Evaluation:

Because the ages of the students ranged from six years to twelve years, it was decided that to give a standard achievement test would not render the results desired. The decision was made to base the evaluation on EEE Staff observed differences in student behavior early and late in the summer program and upon parent's response.

The EEE Staff noted considerable change in interest and attitude toward outdoor activities, increased skills in observation, and improvement in manipulation of equipment.

Parents letters reinforced the observations of the staff and indicated additional benefits such as improved speech.

The EEE Staff report and parent letters may be seen in appendix J.

PROJECT DISSEMINATION

Through the combined efforts of the EEE Staff and LEA School - Community Relations Department, numerous articles featuring the EEE Project have appeared in the following newspapers: St. Louis Globe Democrat, St. Louis Post Dispatch, West County Journal, Community Press, Creve Coeur Citizen, Creve Coeur Community News, and St. Louis County Observer.

Articles have appeared in Parkway School Bulletin, official publication of the Board of Education, which is mailed to each family resident within the District, and the Parkway Staff Bulletin which is circulated to the 1836 employees of the District. Copy and clipping of disseminated information are included in the accompanying booklet. These represent only one printing in cases of duplicates in two or more local papers.

In addition on-the-spot presentations were made by the Director and/or Staff at five PTA Meetings, Missouri ASCD Convention, Annual Conference of Missouri Undergraduate Biology Teachers, Illinois Science Teachers Spring Meeting, Spring Conference of Science Teachers of Missouri, Environmental Education Seminars at Northeast Missouri State College, and 1972 Spring Convention of National Science Teachers Association. Two 1/2 hour interviews were taped and played on local radio programs.

Forty-seven letters of request for information and/or copies of the 16 environmental education units were received as a result of information disseminated during the year.

APPENDIX A

Please Print:

Name_____Date_____

Please Print: Last Name First:

Thank you.

ENVIRONMENTAL EDUCATION COGNITIVE EVALUATION

Directions: Read each item carefully and select the one best answer for each multiple choice question. Circle the letter in front of the one you select. For all items which are not multiple choice, do exactly what the item asks you to do, e.g., list, draw, and write.

Multiple choice example:

a) An animal found in a pond might be . . .

a. A bird.
b. A fish.
c. A squirrel.
d. A rabbit.
e. All of these.

1. A space capsule in space, speeding toward the moon with two men aboard, would best be referred to as . . .

A. The biosphere.

B. A genetic adaptation.

C. An ecosystem.

D. A community.

E. A niche.

2. Almost all food webs begin with producers because . . .

A. Only producers carry on photosynthesis.

B. Only producers can decompose the materials they use.

C. Producers are far more numerous than consumers.

D. Producers are able to grow and reproduce faster than consumers.

E. None of the above.

3. Which statement below best defines the term consumer?

A. A green plant that manufactures its own food.

B. A plant that is parasitic on another plant.

C. An animal that eats other animals only.

D. An animal that eats plants and/or other animals.

E. A mutualist.

4. Which statement below best defines the term niche?

A. The non-living part of the environment.

B. The living part of an ecosystem.

C. The role of an organism in a living community.

D. A very important animal found living in all forest communities.

E. An example of interspecific competition.

5. Which statement best defines the term biotic community?

A. The place where an organism lives.

B. A group of plants and animals living together in a particular location.

C. A group of plants interacting with the abiotic environment.

D. The entire scope of any functioning ecosystem.

E. All of the interspecific relationships existing between two distinct ecosystems.

6. Select the statement which best distinguishes an ecosystem from the biotic community.

A. The biotic community contains only living organisms while the ecosystem involves both organisms and non-living factors.

B. The biotic community contains only plants while the ecosystem contains both plants and animals.

C. The biotic community contains only animals while the ecosystem contains both animals and plants.

D. The community involves both biotic and abiotic factors while the ecosystem is concerned with only non-living factors.

E. The community involves only interspecific relationships while the ecosystem involves both interspecific and intraspecific relationships.

7. Four factors influence the density of any species in a community. Which one of the following is NOT one of them?

A. Natality

B. Mortality

C. Immigration

D. Emigration

E. Population

8. Succession, regardless of the community in which it takes place, has certain characteristics which are almost always common to the phenomenon of succession. Which ONE of the following is NOT characteristic of succession?

A. Successional patterns can be predicted.

B. Succession is a change in communities over time.

C. Succession generally progesses toward more complex communities.

D. Succession always evolves from some form of natural or manmade disaster in the original community.

E. Succession ends in a more or less stable climax community.

9. Which one of the following could a teacher expect to find on the school grounds?

A. An example of predation.

B. An example of parasitism.

C. An example of mutualism.

D. A second order consumer.

E. All of these.

10. A toad eats moths, beetles, worms, and bugs. This is, at least in part, an example of . . .

A. A food web.

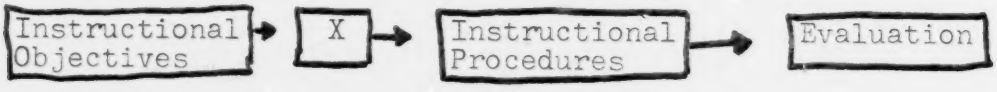
B. Mutualism.

C. Commensalism.

D. Parasitism.

E. None of these.

11. The following is one teaching model design.



The box [X] stands for which of the following:

A. Unit objectives.

B. Attitude objectives.

C. Overall objectives.

D. Pre-assessment.

E. Learning outcomes.

12. A "Teaching Model" designed to provide for an improved instructional technology, is of no value for which of the following time durations of instruction:

A. One hour.

B. One week.

C. One month.

D. One semester.

E. None of these.

13. A "teaching Model" that uses instructional objectives written in performance terms could best be called:

A. A behavioral model.

B. A cognitive model.

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C. An affective model.

D. A psychomotor model.

E. A faculty psychology model.

14. An objective that deals with emotions or feeling indicated by such words as appreciation, enthusiasn, and motivation is called:

A. A cognitive objective.

B. An affective objective.

C. A faculty objective.

D. A prime objective.

E. None of these.

15. A verified, proven instructional procedure would be:

A. To provide a model of terminal performance for children.

B. To have children actively respond during instructional procedures.

C. To give learners an opportunity to repeatedly practice a newly learned performance.

D. To give children prompt and frequent knowledge of their achievement.

E. All of these.

Please read the following and then respond to the tasks which follow it.

The Setting

Assume uou are teaching the fifth grade. Some of your students discover that there are fossils in the building stones of the community library. You discuss this with a local rock hound and find that these building stones are limestone. They were quarried about 15 miles from the library and hauled to the building site. The expert tells you that the limestone rock was depositied some 310 million years ago when a reef existed at the quarry site under an ancient sea. It becomes something of a challenge to you to get

the entire fifth grade involved in a study of fossils animal forms. The children are highly motivated after a visit to the library grounds.

The Problems:

16. At the end of the fossil unit you want your students to know two other places in the community where they can go to see fossils in building materials. Please write one instructional objective below (in performance terms) that would measure this instructional objective.

17. Please underline each instructional objective below which conforms to the major parameters of performance objectives re: Mager, Gagne, or Hungerford and Robinson.

Upon completing the unit on limestone fossils the students will . .

A. . . . understand how fossils were formed at the bottom of the Silurian sea and be able to appreciate the significance of fossilization.

B. . . . be able to point to five different fossil animal forms when presented with a chunk of fossilized limestone containing at least five different species.

C. . . . be able to point to five different fossil animal forms in a chunk of fossilized limestone and correctly name all five fossils.

D. . . . be able to write a paragraph of no more than 50 words describing how fossils were probably formed on the bottom of the ancient silurian sea.

E. . . . exhibit an appreciation of fossils and fossil formation by choosing to read trade (library) books dealing with fossils during free reading time.

---

18. Please list 10 performance terms below which are valid for use in preparing instructional (performance) objectives.

A. _____ F. _____

B. _____ G. _____

C. _____ H. _____

D. _____ I. _____

E. _____ J. _____

A Problem

19. In the space below please draw a forest or pond food chain beginning with a producer and progressing through <u>three consumers</u> in <u>natural sequence</u>. <u>Label</u> each drawing as to the type of organism it represents. Draw <u>arrows</u> between each stage.

I choose a pond _____ forest _____ food chain (check one).

A Problem

20. Assume you are a fourth grade teacher. You teach in a typical elementary school. It is on twelve (12) acres of land, has a blacktop play area, a lawn, shrub fencerow, and a small woods at the edge of the school's property. The soil base is clay loam and there is some erosion near the parking lot. The school is well landscaped. All classrooms have windows. You are teaching during the month of May.

Below, using the space on this sheet, generate a list of the probable ways in which the building site could be used for environmental education for fourth graders. (you may also use the reverse side of this page if necessary.)

EEE Summer Workshop 1971

Pre-Test Scores

Categories	E	G	W	I	PT	FC	L	Total
1.	5	5	0	1	0	0	4	15
2.	8	1	0	1	1	1	5	17
3.	8	4	0	4	0	1	4	21
4.	6	3	0	3	0	1	5	18
5.	4	5	0	2	0	0	4	15
6.	5	5	1	2	6	1	9	29
7.	7	1	1	4	10	1	9	33
8.	8	4	0	4	3	1	10	30
9.	6	4	0	2	0	0	8	20
10.	5	2	1	2	3	0	9	22
11.	4	2	0	5	0	0	7	18
12.	4	3	1	4	5	0	0	17
13.	9	5	1	2	4	0	7	28
14.	3	1	0	4	2	0	6	16
15.	3	4	0	4	8	1	5	25
16.	7	3	1	4	7	0	6	28
17.	7	3	0	2	0	1	4	17
18.	5	5	0	3	8	0	10	31
19.	0	0	0	1	0	0	0	1
20.	8	5	1	3	10	0	10	37
21.	7	3	0	2	1	0	8	21
22.	7	4	0	5	10	1	8	35
23.	7	5	0	1	0	0	10	23
24.	3	1	0	2	0	0	1	7
25.	6	2	0	5	0	0	6	9
26.	5	3	0	3	1	0	5	17
27.	6	3	0	0	0	1	4	14
28.	4	3	0	0	5	0	5	17
29.	7	4	0	4	7	0	6	28
30.	6	4	0	2	1	0	4	17
31.	5	3	0	4	10	1	6	29
32.	6	4	1	2	9	0	6	28
33.	6	3	1	4	7	1	3	25
34.	8	4	0	2	7	0	6	27
35.	4	5	0	1	4	0	5	19
36.	5	4	0	4	9	0	6	28
37.	3	3	1	4	8	0	4	23
38.	6	2	0	0	0	0	5	13
39.	3	2	0	1	0	0	3	9
40.	5	3	0	3	0	0	6	17
41.	5	4	1	4	10	1	8	33
42.	5	5	1	2	3	0	4	20
43.	8	5	0	5	1	0	10	29
44.	6	3	0	4	4	1	9	27
45.	7	2	0	2	5	1	7	24
46.	6	2	0	2	2	1	4	17
47.	4	5	0	2	4	0	10	25
48.	5	4	0	1	0	1	6	17
49.	7	3	0	1	0	0	0	11
50.	5	2	0	3	0	1	7	18
Totals	279	165	12	132	175	18	294	1075

EEE Summer Workshop 1971

Post-Test Scores

Categories	E	G	W	I	PT	FC	L	Total
1.	8	5	1	4	10	1	10	39
2.	7	4	0	4	0	1	10	26
3.	7	5	1	4	10	1	10	38
4.	10	5	1	5	8	1	10	40
5.	9	4	0	4	10	0	10	37
6.	8	5	1	3	10	1	8	36
7.	8	5	1	4	10	1	9	38
8.	10	5	1	5	10	1	10	42
9.	7	4	1	4	10	1	10	37
10.	7	5	1	4	10	1	10	38
11.	9	4	1	4	10	1	10	39
12.	6	5	1	4	10	0	10	36
13.	10	5	1	5	10	1	10	42
14.	4	5	1	3	8	1	7	29
15.	10	5	1	5	10	1	9	41
16.	9	5	1	2	10	1	9	37
17.	9	5	0	4	10	1	10	39
18.	9	5	0	5	10	1	10	40
19.	10	4	1	4	10	1	10	40
20.	9	5	1	5	10	1	10	41
21.	8	5	1	4	10	1	10	39
22.	10	5	1	4	10	0	10	40
23.	9	5	0	4	6	1	1	26
24.	8	5	0	3	10	1	8	35
25.	8	4	1	4	7	1	10	35
26.	7	5	1	2	10	1	10	36
27.	8	5	1	4	10	1	10	39
28.	6	4	1	0	5	1	7	24
29.	8	5	0	4	10	1	10	38
30.	9	5	1	5	10	1	10	41
31.	10	5	1	5	10	1	10	42
32.	8	4	1	5	10	1	10	39
33.	9	5	1	5	10	1	10	41
34.	8	5	0	4	10	0	10	37
35.	5	4	1	4	10	1	10	35
36.	7	5	1	5	10	1	10	39
37.	6	3	1	5	10	1	10	36
38.	7	3	1	4	10	1	10	36
39.	6	4	1	3	7	1	10	32
40.	7	4	0	4	10	1	10	36
41.	9	5	1	4	10	1	10	40
42.	9	4	1	4	10	1	10	39
43.	9	5	1	4	10	1	9	39
44.	8	4	1	4	10	1	1	29
45.	5	5	1	5	8	1	9	34
46.	10	4	1	4	10	1	10	40
47.	8	5	1	3	10	1	10	38
48.	8	3	0	5	10	1	10	37
49.	10	5	0	4	10	1	10	40
50.	10	5	1	5	10	1	7	39
Totals	406	230	39	202	469	46	464	1856

TIME 0746

THIS IS CATEGØRY E.

SUBJECT	PRE-X(1)	PØST-X(2)	DIFF.	DIFF.**2
1	5	8	-3	9
2	8	7	1	1
3	8	7	1	1
4	6	10	-4	16
5	4	9	-5	25
6	5	8	-3	9
7	7	8	-1	1
8	8	10	-2	4
9	6	7	-1	1
10	5	7	-2	4
11	4	9	-5	25
12	4	6	-2	4
13	9	10	-1	1
14	3	4	-1	1
15	3	10	-7	49
16	7	9	-2	4
17	7	9	-2	4
18	5	9	-4	16
19	0	10	-10	100
20	8	9	-1	1
21	7	8	-1	1
22	7	10	-3	9
23	7	9	-2	4
24	3	8	-5	25
25	6	8	-2	4
26	5	7	-2	4
27	6	8	-2	4
28	4	6	-2	4
29	7	8	-1	1
30	6	9	-3	9
31	5	10	-5	25
32	6	8	-2	4
33	6	9	-3	9
34	8	8	0	0
35	4	5	-1	1
36	5	7	-2	4
37	3	6	-3	9
38	6	7	-1	1
39	3	6	-3	9
40	5	7	-2	4
41	5	9	-4	16
42	5	9	-4	16
43	8	9	-1	1
44	6	8	-2	4
45	7	5	2	4
46	6	10	-4	16
47	4	8	-4	16
48	5	8	-3	9
49	7	10	-3	9
50	5	10	-5	25
SUM	279	406	-127	523
MEAN	5.58	8.12	-2.54	

THE 'T' FØR THIS CATEGØRY IS 8.88068
Using .05 level of significance the critical value of 'T' is 1.677.
DØNE AT 0753

STATE 1659

THIS IS CATAGØRY G.

SUBJECT	PRE-X(1)	PØST-X(2)	DIFF.	DIFF.↑2
1	5	5	0	0
2	1	4	-3	9
3	4	5	-1	1
4	3	5	-2	4
5	5	4	1	1
6	5	5	0	0
7	7	8	-1	1
8	8	10	-2	4
9	6	7	-1	1
10	5	7	-2	4
11	4	9	-5	25
12	4	6	-2	4
13	5	5	0	0
14	1	5	-4	16
15	4	5	-1	1
16	3	5	-2	4
17	3	5	-2	4
18	5	5	0	0
19	0	4	-4	16
20	5	5	0	0
21	3	5	-2	4
22	4	5	-1	1
23	5	5	0	0
24	1	5	-4	16
25	2	4	-2	4
26	3	5	-2	4
27	3	5	-2	4
28	3	4	-1	1
29	4	5	-1	1
30	4	5	-1	1
31	3	5	-2	4
32	4	4	0	0
33	3	5	-2	4
34	4	5	-1	1
35	5	4	1	1
36	4	5	-1	1
37	3	3	0	0
38	2	3	-1	1
39	2	4	-2	4
40	3	4	-1	1
41	4	5	-1	1
42	5	4	1	1
43	5	5	0	0
44	3	4	-1	1
45	2	5	-3	9
46	2	4	-2	4
47	5	5	0	0
48	4	3	1	1
49	3	5	-2	4
50	2	5	-3	9
SUM	183	249	-66	178
MEAN	3.66	4.98	-1.32	

THE 'T' FØR THIS CATEGØRY IS 6.85366
Using .05 level of significance the critical value of 'T' is 1.677.
DØNE AT 1706

STATE 1714

THIS IS CATEGØRY W.

SUBJECT	PRE-X(1)	PØST-X(2)	DIFF.	DIFF.↑2
1	0	1	-1	1
2	0	0	0	0
3	0	1	-1	1
4	0	1	-1	1
5	0	0	0	0
6	1	1	0	0
7	1	1	0	0
8	0	1	-1	1
9	0	1	-1	1
10	1	1	0	0
11	0	1	-1	1
12	1	1	0	0
13	1	1	0	0
14	0	1	-1	1
15	0	1	-1	1
16	1	1	0	0
17	0	0	0	0
18	0	0	0	0
19	0	1	-1	1
20	1	1	0	0
21	0	1	-1	1
22	0	1	-1	1
23	0	0	0	0
24	0	0	0	0
25	0	1	-1	1
26	0	1	-1	1
27	0	1	-1	1
28	0	1	-1	1
29	0	0	0	0
30	0	1	-1	1
31	0	1	-1	1
32	1	1	0	0
33	1	1	0	0
34	0	0	0	0
35	0	1	-1	1
36	0	1	-1	1
37	1	1	0	0
38	0	1	-1	1
39	0	1	-1	1
40	0	0	0	0
41	1	1	0	0
42	1	1	0	0
43	0	1	-1	1
44	0	1	-1	1
45	0	1	-1	1
46	0	1	-1	1
47	0	1	-1	1
48	0	0	0	0
49	0	0	0	0
50	0	1	-1	1
SUM	12	39	-27	27
MEAN	.24	.78	-.54	

THE 'T' FØR THIS CATEGØRY IS 7.58431
Using .05 level of signigicance the critical value of 'T' is 1.677.
DØNE AT 1721

TIME 0737

THIS IS CATEGORY I.

SUBJECT	PRE-X(1)	POST-X(2)	DIFF.	DIFF.**2
1	1	4	-3	9
2	1	4	-3	9
3	4	4	0	0
4	3	5	-2	4
5	2	4	-2	4
6	2	3	-1	1
7	4	4	0	0
8	4	5	-1	1
9	2	4	-2	4
10	2	4	-2	4
11	5	4	1	1
12	4	4	0	0
13	2	5	-3	9
14	4	3	1	1
15	4	5	-1	1
16	4	2	2	4
17	2	4	-2	4
18	3	5	-2	4
19	1	4	-3	9
20	3	5	-2	4
21	2	4	-2	4
22	5	4	1	1
23	1	4	-3	9
24	2	3	-1	1
25	5	4	1	1
26	3	2	1	1
27	0	4	-4	16
28	0	0	0	0
29	4	4	0	0
30	2	5	-3	9
31	4	5	-1	1
32	2	5	-3	9
33	4	5	-1	1
34	2	4	-2	4
35	1	4	-3	9
36	4	5	-1	1
37	4	5	-1	1
38	0	4	-4	16
39	1	3	-2	4
40	3	4	-1	1
41	4	4	0	0
42	2	4	-2	4
43	5	4	1	1
44	4	4	0	0
45	2	5	-3	9
46	2	4	-2	4
47	2	3	-1	1
48	1	5	-4	16
49	1	4	-3	9
50	3	5	-2	4
SUM	132	202	-70	210
MEAN	2.64	4.04	-1.4	

THE 'T' FOR THIS CATEGORY IS 6.5479
Using .05 level of significance the critical value of 'T' is 1.677.
DONE AT 0743

STATE 1507

THIS IS CATEGORY PT.

SUBJECT	PRE-X(1)	POST-X(2)	DIFF.	DIFF.↑2
1	0	10	-10	100
2	1	0	1	1
3	0	10	-10	100
4	0	8	-8	64
5	0	10	-10	100
6	6	10	-4	16
7	10	10	0	0
8	3	10	-7	49
9	0	10	-10	100
10	3	10	-7	49
11	0	10	-10	100
12	5	10	-5	25
13	4	10	-6	36
14	2	8	-6	36
15	8	10	-2	4
16	7	10	-3	9
17	0	10	-10	100
18	8	10	-2	4
19	0	10	-10	100
20	10	10	0	0
21	1	10	-9	81
22	10	10	0	0
23	0	6	-6	36
24	0	10	-10	100
25	0	7	-7	49
26	1	10	-9	81
27	0	10	-10	100
28	5	5	0	0
29	7	10	-3	9
30	1	10	-9	81
31	10	10	0	0
32	9	10	-1	1
33	7	10	-3	9
34	7	10	-3	9
35	4	10	-6	36
36	9	10	-1	1
37	8	10	-2	4
38	0	10	-10	100
39	0	7	-7	49
40	0	10	-10	100
41	10	10	0	0
42	3	10	-7	49
43	1	10	-9	81
44	4	10	-6	36
45	5	8	-3	9
46	2	10	-8	64
47	4	10	-6	36
48	0	10	-10	100
49	0	10	-10	100
50	0	10	-10	100
SUM	175	469	-294	2414
MEAN	3.5	9.38	-5.88	

THE 'T' FOR THIS CATEGORY IS 11.118
Using .05 level of significance the critical value of 'T' is 1.677.
DONE AT 1513

DATE 1555

THIS IS CATEGORY FC.

SUBJECT	PRE-X(1)	POST-X(2)	DIFF.	DIFF.**2
1	0	1	-1	1
2	1	1	0	0
3	1	1	0	0
4	1	1	0	0
5	0	0	0	0
6	1	1	0	0
7	1	1	0	0
8	1	1	0	0
9	0	1	-1	1
10	0	1	-1	1
11	0	1	-1	1
12	0	0	0	0
13	0	1	-1	1
14	0	1	-1	1
15	1	1	0	0
16	0	1	-1	1
17	1	1	0	0
18	0	1	-1	1
19	0	1	-1	1
20	0	1	-1	1
21	0	1	-1	1
22	1	0	1	1
23	0	1	-1	1
24	0	1	-1	1
25	0	1	-1	1
26	0	1	-1	1
27	1	1	0	0
28	0	1	-1	1
29	0	1	-1	1
30	0	1	-1	1
31	1	1	0	0
32	0	1	-1	1
33	1	1	0	0
34	0	0	0	0
35	0	1	-1	1
36	0	1	-1	1
37	0	1	-1	1
38	0	1	-1	1
39	0	1	-1	1
40	0	1	-1	1
41	1	1	0	0
42	0	1	-1	1
43	0	1	-1	1
44	1	1	0	0
45	1	1	0	0
46	1	1	0	0
47	0	1	-1	1
48	1	1	0	0
49	0	1	-1	1
50	1	1	0	0
SUM	18	46	-28	30
MEAN	.36	.92	-.56	

THE 'T' FOR THIS CATEGORY IS 7.32486

Using .05 level of significance the critical value of 'T' is 1.677.

DONE AT 1601

STATE 0832

THIS IS CATEGØRY L.

SUBJECT	PRE-X(1)	PØST-X(2)	DIFF.	DIFF.↑2
1	4	10	-6	36
2	5	10	-5	25
3	4	10	-6	36
4	5	10	-5	25
5	4	10	-6	36
6	9	8	1	1
7	9	9	0	0
8	10	10	0	0
9	8	10	-2	4
10	9	10	-1	1
11	7	10	-3	9
12	0	10	-10	100
13	7	10	-3	9
14	6	7	-1	1
15	5	9	-4	16
16	6	9	-3	9
17	4	10	-6	36
18	10	10	0	0
19	0	10	-10	100
20	10	10	0	0
21	8	10	-2	4
22	8	10	-2	4
23	10	1	9	81
24	1	8	-7	49
25	6	10	-4	16
26	5	10	-5	25
27	4	10	-6	36
28	5	7	-2	4
29	6	10	-4	16
30	4	10	-6	36
31	6	10	-4	16
32	6	10	-4	16
33	3	10	-7	49
34	6	10	-4	16
35	5	10	-5	25
36	6	10	-4	16
37	4	10	-6	36
38	5	10	-5	25
39	3	10	-7	49
40	6	10	-4	16
41	8	10	-2	4
42	4	10	-6	36
43	10	9	1	1
44	9	1	8	64
45	7	9	-2	4
46	4	10	-6	36
47	10	10	0	0
48	6	10	-4	16
49	0	10	-10	100
50	7	7	0	0
SUM	294	464	-170	1240
MEAN	5.88	9.28	-3.4	

THE 'T' FØR THIS CATEGØRY IS 6.54083

Using .05 level of significance the critical value of 'T' is 1.677.

DØNE AT 0838

STATE 0731

THIS IS CATEGORY TOTAL.

SUBJECT	PRE-X(1)	POST-X(2)	DIFF.	DIFF.**2
1	15	39	-24	576
2	17	26	-9	81
3	21	38	-17	289
4	18	40	-22	484
5	15	37	-22	484
6	19	36	-17	289
7	33	38	-5	25
8	30	42	-12	144
9	20	37	-17	289
10	22	38	-16	256
11	18	39	-21	441
12	17	36	-19	361
13	28	42	-14	196
14	16	29	-13	169
15	25	41	-16	256
16	28	37	-9	81
17	17	39	-22	484
18	31	40	-9	81
19	1	40	-39	1521
20	37	41	-4	16
21	21	39	-18	324
22	35	40	-5	25
23	23	26	-3	9
24	7	35	-28	784
25	9	35	-26	676
26	17	36	-19	361
27	14	39	-25	625
28	17	24	-7	49
29	28	38	-10	100
30	17	41	-24	576
31	29	42	-13	169
32	28	39	-11	121
33	25	41	-16	256
34	27	37	-10	100
35	19	35	-16	256
36	28	39	-11	121
37	23	36	-13	169
38	13	36	-23	529
39	9	32	-23	529
40	17	36	-19	361
41	33	40	-7	49
42	20	39	-19	361
43	29	39	-10	100
44	27	29	-2	4
45	24	34	-10	100
46	17	40	-23	529
47	25	38	-13	169
48	17	37	-20	400
49	11	40	-29	841
50	18	39	-21	441
SUM	1055	1856	-801	15657
MEAN	21.1	37.12	-16.02	

THE 'T' FOR THIS CATEGORY IS 14.9189
Using .05 level of signigicance the critical value of 'T' is 1.677.
DONE AT 0737

PERCT 1034

THIS IS CATEGORY TOTAL.

SUBJECT	PRE-PERCENT	POST-PERCENT	PERCENTAGE DIFF.
1	.357143	.928571	.571429
2	.404762	.619048	.214286
3	.5	.904762	.404762
4	.428571	.952381	.52381
5	.357143	.880952	.52381
6	.690476	.857143	.166667
7	.785714	.904762	.119048
8	.714286	1	.285714
9	.47619	.880952	.404762
10	.52381	.904762	.380952
11	.428571	.928571	.5
12	.404762	.857143	.452381
13	.666667	1	.333333
14	.380952	.690476	.309524
15	.595238	.97619	.380952
16	.666667	.880952	.214286
17	.404762	.928571	.52381
18	.738095	.952381	.214286
19	2.38095E-02	.952381	.928571
20	.880952	.97619	9.52381E-02
21	.5	.928571	.428571
22	.833333	.952381	.119048
23	.547619	.619048	7.14285E-02
24	.166667	.833333	.666667
25	.214286	.833333	.619048
26	.404762	.857143	.452381
27	.333333	.928571	.595238
28	.404762	.571429	.166667
29	.666667	.904762	.238095
30	.404762	.97619	.571429
31	.690476	1	.309524
32	.666667	.928571	.261905
33	.595238	.97619	.380952
34	.642857	.880952	.238095
35	.452381	.833333	.380952
36	.666667	.928571	.261905
37	.547619	.857143	.309524
38	.309524	.857143	.547619
39	.214286	.761905	.547619
40	.404762	.857143	.452381
41	.785714	.952381	.166667
42	.47619	.928571	.452381
43	.690476	.928571	.238095
44	.642857	.690476	.047619
45	.571429	.809524	.238095
46	.404762	.952381	.547619
47	.595238	.904762	.309524
48	.404762	.880952	.47619
49	.261905	.952381	.690476
50	.428571	.928571	.5
MEAN	.507143	.883809	.376666

DONE AT 1039

```
GET-STATE
70
110
133 FØR N=1 TØ 50
120 PRINT "THIS IS CATEGØRY G."
SCR
GET S--STATE
70
110
133 FØR N=1 TØ 50
120 PRINT "THIS IS CATEGØRY G."
150 PRINT "THE 'T' FØR THIS CATEGØRY IS "ABS(T)
RUN
```

```
---
PERCT

 5  LET W=Y=0
 10  DIM A[50],B[50],W[50],Y[50]
 20  FØR I=1 TØ 50
 30  READ A[I],B[I]
 40  LET W=W+A[I]/42
 50  LET Y=Y+B[I]/42
 60  NEXT I
 70  PRINT "THIS IS CATEGØRY TØTAL."
 80  PRINT
 90  PRINT
 100  PRINT "SUBJECT","PRE-PERCENT","PØST-PERCENT","PERCENTAGE DIFF."
 110  PRINT
 120  FØR N=1 TØ 50
 130  PRINT N,A[N]/42,B[N]/42,B[N]/42-A[N]/42
 140  NEXT N
 145  PRINT
 150  PRINT "MEAN",W/50,Y/50,Y/50-W/50
 160  DATA 15,39,17,26,21,38,18,40,15,37,29,36,33,38,30,42
 170  DATA 20,37,22,38,18,39,17,36,28,42,16,29,25,41,28,37
 180  DATA 17,39,31,40,1,40,37,41,21,39,35,40,23,26,7,35,9,35
 190  DATA 17,36,14,39,17,24,28,38,17,41,29,42,28,39,25,41,27,37
 200  DATA 19,35,28,39,23,36,13,36,9,32,17,36,33,40,20,39,29,39
 210  DATA 27,29,24,34,17,40,25,38,17,37,11,40,18,39
 220  END
```

```
STATF

10  DIM A[50],B[50],D[50],R[50]
20  LET S=E=Q=X=0
30  FØR I=1 TØ 50
40  READ A[I],B[I]
50  LET S=S+A[I]
60  LET Q=Q+B[I]
70  LET D[I]=A[I]-B[I]
80  LET E=E+D[I]
90  LET R[I]=D[I]↑2
100  LET X=X+R[I]
110  NEXT I
120  LET T=E/SQR((50*X-(E)↑2)/49)
130  PRINT "THIS IS CATEGØRY L."
140  PRINT
150  PRINT
160  PRINT "SUBJECT","PRE-X(1)","PØST-X(2)","DIFF.","DIFF.↑2"
170  PRINT
180  FØR N=1 TØ 50
190  PRINT N,A[N],B[N],D[N],R[N]
200  NEXT N
210  PRINT "SUM",S,Q,E,X
220  PRINT
230  PRINT "MEAN",S/50,Q/50,E/50
240  PRINT
250  PRINT "THE 'T' FØR THIS CATEGØRY IS "ABS(T)
260  DATA 4,10,5,10,4,10,5,10,4,10,9,8,9,9,10,10
270  DATA 8,10,9,10,7,10,0,10,7,10,6,7,5,9,6,9,4,10,10,10,0,10
280  DATA 10,10,8,10,8,10,10,1,1,8,6,10,5,10,4,10,5,7,6,10
290  DATA 4,10,6,10,6,10,3,10,6,10,5,10,6,10,4,10,5,10,3,10
300  DATA 6,10,8,10,4,10,10,9,9,1,7,9,4,10,10,10,6,10,0,10
310  DATA 7,7
320  END
```

APPENDIX B

ENVIRONMENTAL ECOLOGICAL EDUCATION PROJECT

ATTITUDE CLUSTER SURVEY ON ENVIRONMENTAL PROBLEMS

Indicate your reaction to the following statements by checking the appropriate location on the response line

1. Zone an area so existing air pollution sources are not allowed to affect the appearance of buildings.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

2. Legislate to require industries to periodically remove unsightly refuse from their river property.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

3. Tax hunting license sales to provide funds for restocking gamebirds for all to enjoy.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

4. Educate adults through a television course to appreciate the natural beauty of trees along roads to prevent their destruction.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

5. Levy a fine on farmers who create eyesores by allowing soil to erode.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

6. Offer financial incentives to towns which screen junkyards and dumps from public view.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

7. Demonstrate for a clean air program and its affect on improving the appearance of buildings.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

8. Serve on a committee to stop the disposal of unsightly refuse in and along a river.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

9. Vote for long range gamebird management programs because of their importance to nature lovers.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

10. Write to the town council to develop a program for future plantings along a scenic road.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

11. Join a local organization dedicated to the development of soil stabilization programs to prevent soil erosion creating eyesores.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

12. Speak in favor of reuse of materials from junkyards and dumps.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

13. Offer temporary financial incentives to manufacturers equipping motor vehicles with pollution devices to reduce air pollution costs.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

14. Limit water consumption and stabilize water prices in residential areas by zoning water use.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

15. Legislate special funds to stock fish to assure income from tourists.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

16. Temporarily increase taxes on poorly managed timberland to compensate for the lowering of land prices.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

17. Educate through a newspaper series about the correct use of chemical fertilizers to increase crop yields.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

18. Levy heavy fines for vandalism and littering in heavily used park lands to prevent income loss from tourism.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

19. Levy fines for open burning at dumps to reduce damage to the natural environment.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

20. Offer financial incentives to power plants which do not upset the biological balance by raising the water temperature.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

21. Reduce the killing of predators by zoning private woodlots as preserves to assure a balance in the environment.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

22. Legislate temporary measures to limit damage to endangered plant communities.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

23. Increase taxes on harmful pesticides to discourage their use and the subsequent ill affects on necessary soil organisms.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

24. Educate through leaflets about the importance of limiting roads which upset the natural balance in wilderness areas.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

25. Speak in favor of initiating a research program into automobile pollution control devices to reduce costs from polluted air.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

26. Demonstrate for a study of the methods of increasing water supply to reduce water costs.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

27. Serve on a committee devoted to developing fish management programs to stimulate tourism.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

28. Cast your vote to require lumber industries to institute long range management practices to ensure land prices.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

29. Write a letter promoting the conversion of poor crop land to more profitable use.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

30. Join an organization devoted to restricting use of park land to prevent income losses from tourist trade.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

31. Join an organization working to eliminate open burning in favor of other methods of refuse disposal to prevent environmental damage.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

32. Make a speech in favor of regulating power plant thermal pollution which upsets the biological balance.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

33. Demonstrate for predator management programs to assure a balance in the environment.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

34. Serve on a committee to study the affects of heavy use on plant communities and take steps to protect them.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

35. Cast your vote to eleminate pesticides which are harmful to soil conditions.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

36. Write a letter to expand wilderness areas to reduce over use.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

37. Write a letter to the editor demanding an immediate clean up program on building discolored by air pollution.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

38. Join an organization devoted to removing refuse from in and along a river to beautify it.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

39. Speak for hunting restrictions on gamebirds during the coming year so that there will be more of them for people to enjoy.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

40. Demonstrate to prevent the removal of trees from along a scenic road schedule to be widened.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

41. Serve on a committee to beautify the community by cleaning up soil washed on to the streets.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

42. Vote to screen junkyards and dumps from public view.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

43. Serve on a committee devoted to limiting open burning at dumps to reduce environmental degradation.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

44. Vote in favor of periodically regulating the amount of heated water put into a river during low flow to minimize biological deterioration.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

45. Write a letter in favor of removing bounties on predators because of their importance to the biological community.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

46. Join an organization favoring the protection of plant communities currently threatened with extinction.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

47. Speak in favor of regulating the use of harmful pesticides in local gardens because of the side effects on the soil balance.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

48. Demonstrate to limit the number of roads into existing wilderness areas to maintain the natural balance.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

49. Vote to require pollution control devices on motor vehicles to reduce the costs of air pollution damage

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

50. Write a letter to the editor favoring limited use of water during dry periods to prevent increased water costs.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

51. Join an organization devoted to stocking fish to assure income from tourists.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

52. Speak in favor of penalizing owners of poorly managed timber land to compensate for the lowering of land prices in the surrounding area.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

53. Demonstrate at the farm bureau office for the correct use of chemical fertilizers to increase farm profits.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

54. Work on a committee to repair vandal damage and remove litter from park land to prevent loss of income from tourist trade.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

55. Provide funds through an automobile sales tax for research into automobile pollution control devices.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

56. Educate about water consumption to help stabilize water prices.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

57. Increase fish management funds through fines on violations of fishing regulations to stimulate tourism.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

58. Encourage timber management to stabilize land prices by offering financial assistance to lumber companies.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

59. Manage farm lands through zoning to ensure the profitable use of less fertile areas.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

60. Regulate park land use through legislation to prevent loss of income from tourism.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

61. Legislate a research program to find refuse disposal systems which are compatible with the natural environment.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

62. Heavily tax power plants which create thermal pollution and upset the biological balance.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

63. Educate through school programs about the importance of predators on the balance of nature.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

64. Develop a program for fining individuals who damage plant communities which are valuable to society.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

65. Offer financial incentive to individuals for not using pesticides which are harmful to soil conditions

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

66. Maintain wilderness areas by zoning to reduce over use.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

67. Educate for appreciating the results of a clean air program and its affect on improving the appearance of buildings.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

68. Levy heavy fines on industries which dump unsightly refuse in and along a river.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

69. Offer financial incentives to land owners who provide improved habitats for gamebirds for all to enjoy.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

70. Zone road rights-of-way to protect trees and provide for future plantings for scenic value.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

71. Legislate soil stabilization programs to prevent soil erosion from creating eyesores.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

72. Tax the public to provide funds for removal or reuse of materials from junkyards and dumps.

Highly Favorable	Favorable	Undecided	Unfavorable	Highly Unfavorable

APPENDIX C

1. Write your definition of .

"Environmental Ecological Education is a unit of study designed to acquaint the classroom pupils with the constantly changing effects of the elements, and their preservation, on the area surrounding them in their daily life. Questions are brought out and an attempt is made to answer them by using the environment surrounding the students."

2. Analyze in writing two major viewpoints involved with the issue of housing density zoning in the Parkway School District.

   a. Housing density zoning where high-rise apartments or houses on very small acreage is concerned, would not be a condition that the Parkway School District would consider as satisfactory. The reasoning being thus: More children would move into the area and tend to overcrowd the already existing schools, or pose a dire need for new schools to be built; higher taxes would have to be levied, therefore, putting a strain on the income of the incoming and already existing families, causing them to reject the levies. Another factor might be the status of the incoming families and the type of behavior of the children. Some families might be a type of "I-don't-care-about-anything" family and the children might be totally disruptive.

   b. Commercial zoning in the Parkway School District, on the other hand, would be encouraged because it would bring in more tax money immediately, whereas, the residential areas would cause a delay in tax money. The money from the commercial zoning would be brought in and used as needed. The commercial zoning would not bring in a steady influx of families, and would not cause the constant overcrowding of the schools; causing the building of new schools or the purchase of more buses in order to transport the children to school and home.

3. State your position on the zoning issue in a letter of at least 60 words.

"In my opinion, I would far more line my street with residential dwellings than to see commercial business taking the place of the nice homes. I would rather live in an area where more homes are to be built than to be surrounded by commercial housing. It would be much to my distress as a homeowner, to be bothered by the noises and confusions of gas stations, department stores, groceries, doctors or dentists offices, and many other undesireable businesses.

The problems of traffic, noise, trash, delivery trucks, shoppers, and unruly children allowed to roam at will while mother shops, trash, and yes, even the possibility of unwanted rodents as a result of the trash and filth situation, would, I feel, devalue my property. With more homes being built, the value of my home would be increased in resale value and my chances of selling, if and when the time comes, would be more than good."

4. List and briefly describe three environmental problems considered by you to be most important from the standpoint of the community, the state, the nation, and the world.

"I consider the following three problems to be of equal importance in all four areas: 1) Community 2) State 3) Nation 4) World."

a. POLLUTION (WATER)

The dumping of industrial and residential wastes into the rivers, lakes, oceans, ponds, streams is causing a shortage of suitable water for drinking, bathing, household use, recreational activities, etc. It is also a killing factor to many animals, fish, and birds.

b. POLLUTION (NOISE)

Noise pollution is to blame for many of the aches and pains a person may have. Noise has been blamed for damaging hearing; causing nervousness, high blood pressure, tiredness, headaches, indigestion, and stomach ulcers to name a few. People often have trouble sleeping because of the noise around them.

c. POPULATION

The large influx of people moving to the outer edges of the cities is causing the building of housing developments to progress at a rate so fast and so vast that the already existing areas are becoming overcrowded. The inner cities are becoming virtually deserted and have continued to go into a steady decline in importance.

5. List at least ten of the best sources of useful instructional materials written for the teaching of EEE at a grade level of your choice.

PRIMARY LEVEL (K-3)

Anderson, Dorothy S., SOUND, Garrard Publishing Co., Champagne, Illinois, 1962.

Baron, R. A., "Noise, What It Does To You." VOGUE, 1970.

Carson, R., SILENT SPRING, Fawcett Publishing Co., Inc., Greenwich, Connecticut, 1970.

Feravolo, Rocco, SOUND, Dodd, Mead and Co., New York, 1962.

Field Enterprises Educational Corporation, THE WORLD BOOK ENCYCLOPEDIA, Chicago, Illinois, 1965.

Froman, Robert, THE MANY HUMAN SENSES, Little, Brown and Co., Boston, Massachusetts, 1966.

Geisel, A. S. and Seuss, Dr., "The Lorax," WOMAN'S DAY, August, 1971.

Holt, Catherall, WORKING WITH SOUNDS, A. Whitman anc Co., Chicago, Illinois, 1969.

Keen, Martin L., SOUND, Grosset and Dunlap, New York, New York, 1962.

Saltonstall, R. Jr., YOUR ENVIRONMENT AND WHAT YOU CAN DO ABOUT IT., Walker and Co., New York, New York, 1970.

6. Design at least nine learning activities for children or youth of a specified grade level related to the environmental problems listed in #4.

a. WATER POLLUTION

1. Show the film available from the St. Louis County Library. "YOUR FRIEND THE WATER"

2. Take a trip to a polluted stream, lake, river, pond, etc. and figure out how it could be corrected.

3. Take a field trip to a water treatment plant to see how the water is received and treated there. Upon return to the classroom, draw pictures that relate to the trip and use as a classroom mural on WATER POLLUTION.

b. NOISE POLLUTION

1. Noise puppets: Children make puppets and act out on a simple stage, how their noise effects people.

2. Take an outside walk around the school and listen to noises. Classify them in the classroom in terms of pleasant or unpleasant noises.

3. Take a field trip to an airport and talk with one of the men there who directs the planes from the ground as to the effect of noises on him and on the surrounding houses and people.

c. POPULATION

1. Take two field trips, one to the inner city and one to a rural area of St. Louis County.

2. Contrast in writing and in picture form the two field trips, dwelling on the density and sparseness of population in these two areas and what can cause this.

3. Show the film available from the St. Louis County Library. "PEOPLE BY THE BILLIONS."

7. Write, for evaluative purposes, behavorial objectives for each activity listed in #6.

a. WATER POLLUTION

1. Students will be able to list factors contributing to water pollution.

2. Students will be able to list ways to control water pollution.

3. Students will be able to list ways water pollution effects their area.

b. NOISE POLLUTION

1. Seventy percent of the students will be able to list orally or in writing at least three ways in which noise is becoming an increasing problem.

2. Seventy percent of the students will be able to list orally or in writing at least three ways in which they can reduce noise in their community.

3. Eighty percent of the students will be able to correctly identify characteristics of noise from a list of four choices.

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c. POPULATION

1. Students will be able to list the advantages of population control.

2. Students will be able to list areas of the world with a great population density.

3. Students will be able to list areas of the world with sparse population.

8. List at least three ecological implications involved in a given environmental problem.

Over population causes these three ecological problems:

1. A definite shortage of food.

2. More pollution to all areas.

3. Economic instability.

APPENDIX D

School Robin Hill

Teacher Goldman

Unit The Changing Scene

Student post-test results will be grouped in the following manner:

Example:

Number of post-test questions given 12.

Number of students	Number of questions answered correctly.
6	12
5	10
8	9

Number of post-test questions given. 10

Number of Students Students	Number of Questions Answered Correctly
38	10
43	9
17	8
11	7
Total 109 enrolled	

Number of post-test questions given. _____

Number of Students	Number of Questions Answered Correctly

APPENDIX E

Criteria for Evaluation
Attitudes, Behaviors and Skills in Field Studies
Developed by
Verlin M. Abbott
Science Consultant
Parkway School District

1. Curiosity - awareness of environment, questioning attitude
2. Powers of observation
3. Identification or interpretation of a problem
4. Organization and prupose in attacking a problem
5. Imagination in integrating background knowledge and experience
6. Willingness to risk failure or try a novel idea
7. Initiative - ability ot work independent of direct guidance
8. Purpose and facility in using equipment
9. Record keeping - completeness and form
10. Communication - relevancy of message, balancing between listening and telling
11. Ability to classify information and delineate problems
12. Ability to evaluate data and formulate generalizations
13. Ability to complete a job
14. Sense of responsibility to a group
15. Care of and respect for equipment
16. Care of and respect for natural surroundings

Marking Periods

	1	2	3	4
1.	+	+	+	+
2.	✓	✓	+	+
3.	✓	✓		+
4.	✓			+
5.	✓	✓		+
6.		+	+	+
7.			+	+
8.		✓	+	+
9.	✓	✓		+
10.	✓		+	+
11.	✓			
12.	✓	✓		
13.	+	+	+	+
14.	+	+	+	+
15.				+
16.			+	+

Name: Charles Swartz
Teacher: Estes
Grade: 5th Bellerive
Units and Projects Worked On:
Pond Study
Living forest
Communities In Nature
Metropolitan Sewer Dist.

\+ Doing good work
✓ Improvement needed
No mark indicates no comment at present
Notes: _____

APPENDIX F

I see many trees and I see many leaves,
but I do not see any bees. I see trees with pine cones,
but they are all in little zones. On the bark
on the trees is not dark! And on a needle
I see a little bettle!!! Mark Gittemeier.

I have a favorite spot thats not for little tots,
there is a robin in a nest, at night she makes her
little ones rest. There is a tree that's not for me,
because it is full of stickers and bees! Robert Stephens

I see a bird and I see a bee, I see a lake but
for goodness sake keep it clean. I see the dining
hall where we have a ball. I see the leafs blowing
in the breeze-it is noon and I see the weather
balloon! I see the people shooting bows and arrows,
I have seen the lead mine--theres not another of
its kind! I saw the water wheel and had to kneel,
I see the stone harder than bone! Grady Durham

Mountains are low, mountains are high, But golly gee,
the wind does blow. The trees are big the trees are
brown-the biggest tree is bigger than me! Tom Radcliff

In my spot there are two trees and there are many bees,
and some scattered leafs. There is a drain pipe and it
has white stripes. Jim Thrash

In my spot there are 2 pine trees and all kinds of
weeds--a drain pipe and birds and bees. Eric Eberhard.

I see a tree a pretty tree I wish belonged to me.
I like it so standing there so straight and tall--
it probably could run city hall! Oh, my tree is
very pretty. Alan Poston

Hear the morning bigle call now we go to the dinning hall.
Eat breakfast fast or we'll be last. Now we go to
activity one-oops! we are not supposed to run! Newsroom,
newsroom here we go-Mrs. Foster said we shouldn't be slow-
she wants us in our favorite spot--"Hey, over there--whats
that big dot?" I am writing this poem on a beautiful day--
which is really all I have to say! Kent Green

A dandy lion, a poppy stem, a straight and sturdy tree,
with a clumsy bumble bee! A weed with a deed and a wind
that is the living end! But a lowly wasp without a cause!!
Marlon Fick

Roses are red, violets are blue,
I like pine cones like I like you

When the clocks are ringing the
bells are dinging, the birds are
singing and the pine trees swing-
ing Doug Brown

I see all kinds of living things
I see birds fluttering their wings
I see boats and floats and docks.
I see trees and 2 or 3 bumble bees
Dan Gerker

I see a bee almost the color
of me! I see the flowers by the
tower! I see the flag as it
jags in the wind. John Kelly

In my spot there are lots of dots
There is a nest where a mother
robin rests. There is green grass
thats gets greener when I pass.
There are six trees and guess
what I see--a bumble bee! And
this is my spot that I think is
nice--so don't complain and eat
your rice! Bob Kent

The lightning struck my tree,
and tore its bark in two.
Its gaping side is bare and stark,
I know death will come soon.
Living grass lays at its feet,
the water is close by-but this
poor tree is past its time-she
breathes a heavy sigh. Pegasus

My spot has trees of golden leaves
It has birds singing their say, an
The breeze blowing its way.
Louis Kidder

Miss Long. June 2, 1972

Thank you for taking up your time to day. I hope you do not have a headache when you get home. I'm glad we got you as a guid. You were nice because you let us get boys and play with them.

Your friend
Theresa Cameron

June 2, 1972

Miss Long,

Thank you for the lovely tour. I enjoyed it very much. I also liked learning about trees. I've never known what poison ivy looked like until today.

Yours Truly,
Cherri
Adelson

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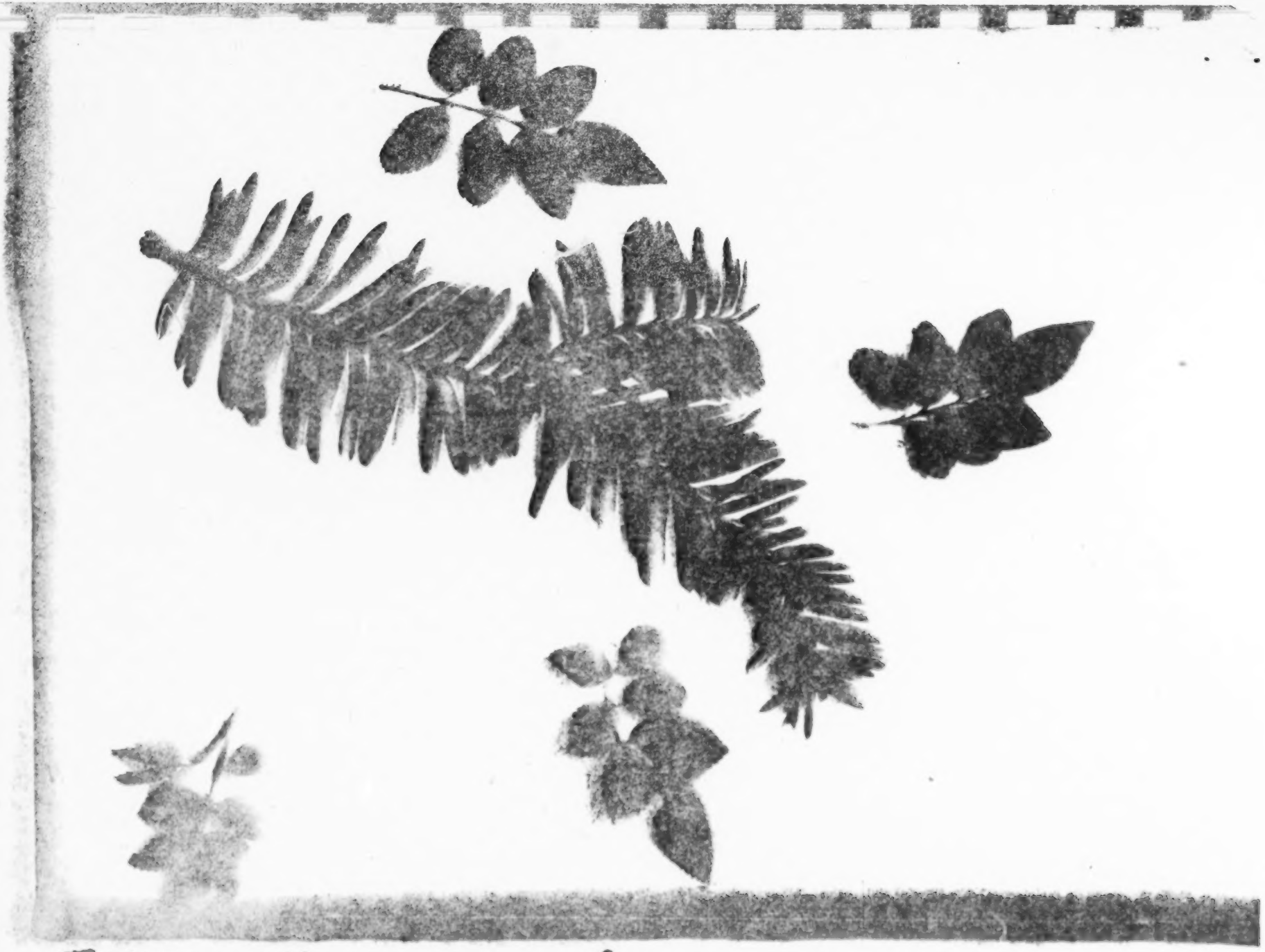


SHELLEY LESAK 1

APPENDIX G

Environmental Attitudes
Pre-and-Post Resident Camp
Evaluation

Student_____

Teacher Evaluator _____

Date _____Pre_____ Post _____

Low High

1. The student relates to his surrounding natural environment.

1 - - - - - - - - - 10

2. The student expresses a feeling toward conservation practices.

1 - - - - - - - - - 10

3. The student indicates a knowledge of man's interdependence with his natural environment.

1 - - - - - - - - - 10

4. The student expresses a concern for the preservation of the environment.

1 - - - - - - - - - 10

5. Does the student show a concern for actual waste of classroom materials?

1 - - - - - - - - - 10

6. Does the student express a concern for man's survival?

1 - - - - - - - - - 10

7. Is interest shown by the student for life process or organisms and their food chains through projects, writings, art or music expressions?

1 - - - - - - - - - 10

8. What priority does the student place on his environment?

1 - - - - - - - - - 10

9. Does the student express a desire to participate in out-of-door activities?

1 - - - - - - - - - 10

10. Offers rational solutions to environmental problems.

1 - - - - - - - - - 10

Social Attitude
Pre-and-Post Resident Camp
Evaluation

Student _____

Teacher Evaluator _____

Date _____ Pre_____ Post_____

	Low	High
1. Does student positively interact with his peer group?	1	10
2. Will the student listen to a peer's point of view?	1	10
3. After discussing points of view with a peer, the student respects the other opinion even when there is no agreement.	1	10
4. Is the student willing to assume a leadership role?	1	10
5. When the student does not have a leadership role, is there a willingness to take directions?	1	10
6. Does the student, when in a leadership role, show empathy towards other's feelings?	1	10
7. Does student relate to adult leaders?	1	10
8. Does the student relate socially to adult leaders?	1	10
9. Is the student selective in his relationship to adult leaders?	1	10
10. Is the student sympathetic with the behavior of others?	1	10

	ENVIRONMENTAL ATTITUDES		SOCIAL ATTITUDE	
	Pre	Post	Pre	Post
1.	23	68	25	34
2.	21	91	37	68
3.	17	73	38	73
4.	16	84	24	57
5.	17	78	22	77
6.	17	74	31	71
7.	20	67	24	55
8.	16	59	24	88
9.	14	70	30	59
10.	15	85	30	74
11.	20	72	23	49
12.	10	76	13	41
13.	15	82	32	64
14.	26	90	35	76
15.	10	78	21	87
16.	32	67	34	98
17.	24	71	23	78
18.	17	80	27	66
19.	15	76	20	45
20.	10	71	20	73
21.	26	89	28	52
22.	19	11	26	72
23.	21	74	26	62
24.	20	74	17	77
25.	20	69	37	85
26.	24	72	34	74
27.	18	83	21	61
28.	18	76	20	65
29.	16	83	23	77
30.	21	87	30	63
31.	13	76	22	58
32.	17	81	30	61
33.	17	84	32	88
34.	19	74	23	62
35.	17	67	16	45
36.	15	72	37	94
37.	14	88	21	72
38.	21	79	24	69
39.	17	73	25	43
40.	14	70	26	69
41.	29	80	33	78
42.	19	76	27	66
43.	18	68	25	65
44.	12	80	20	46
45.	27	76	32	78
46.	19	79	15	44
47.	20	65	34	68
48.	18	69	34	79
49.	10	74	31	77
50.	12	68	15	71

	ENVIRONMENTAL ATTITUDES		SOCIAL ATTITUDE	
	Pre	Post	Pre	Post
51.	10	76	22	51
52.	18	75	40	80
53.	17	69	31	77
54.	23	92	24	67
55.	19	82	18	68
56.	21	68	22	94
57.	19	71	26	59
58.	14	76	20	50
59.	17	88	30	91
60.	20	88	23	85
61.	23	69	36	86
62.	12	75	19	55
63.	18	71	36	62
64.	17	78	37	83
65.	17	71	35	83
66.	20	88	27	75
67.	21	83	26	78
68.	13	81	21	67
69.	24	77	27	55
70.	16	75	22	71
71.	17	82	25	66
72.	23	75	22	90
73.	18	68	27	69
74.	19	79	30	71
75.	19	91	32	54
76.	17	76	17	83
77.	18	76	26	89
78.	16	76	33	73
79.	24	78	28	72
80.	25	74	27	86
81.	25	73	25	71
82.	13	76	23	87
83.	25	74	30	93
84.	16	74	24	95
85.	18	81	30	60
86.	21	78	32	85
87.	10	74	17	53
88.	21	67	21	72
89.	13	76	25	75
90	15	64	23	30
91.	16	74	21	66
92.	14	65	18	83
93.	18	76	40	92
94.	20	70	25	53
95.	16	72	20	69
96.	19	66	36	94
97.	16	76	32	93
98.	16	19	25	81
99.	20	85	34	88
100.	19	72	36	86

APPENDIX H

QUESTIONNAIRE FOR CAMPERS

Please underline the phrases which you think best describes the way you feel about your experience at camp.

1. Did you make any new friends? Many 29 A few 64 None 7
2. While at camp did you learn to like anyone you had not liked before:
   Yes 56 No 28 Do not know 16
3. While at camp did you find out that you did not like someone you had liked before? Yes 42 No 46 Do not know 8
4. Did you learn anything new about our enviroment, nature and the out-of-doors. Many things 53 A few things 45 Nothing 2
5. While at Trout Lodge did you use any of the things you learned at school? A great many 10 Some 79 None 11
6. How do you feel about such jobs as cabin cleaning, bedmaking, and "?"
   Enjoyed 4 Did not mind 68 Disliked 24
7. Check the health habits you practiced while at camp
   Tried new foods 55
   Brushed teeth regularly 35
   Took care of small injuries 47
   Bathed regularly 45
   Cared for feet 40
8. How did you get along with the other boys and girls at camp?
   Better than at school 59 The same as at school 38 Not as w ll as at school 3
9. Do you feel that your teacher are now: More of a friend? 41 Less of a friend? 10 About the same? 49
10. List in order (1-12) how you liked the following subjects:
    Spillway_____
    Cracks_____
    Water Wheel_____
    Creative Dramatics_____
    Meadow Study_____
    Cave_____
    North-South Slope_____
    Arts and Crafts_____
    Limestone Geology_____
    Archery_____
    Economic Geology_____
    Water Enviroment_____

    See results on attached sheet
11. Did you learn anything about: Conservation Yes 84 No 7
    Pollution Yes 55 No 34 If yes, how do you intend to put this knowledge to use? Sample responses
    By not polluting
    Clean up after yourself
    Care more about it
    Put litter in it's place
    Tell other people

12. Considering this was not like home, do you feel the cabins were:

Comfortable	Yes 79	No 11			
Beds	Good 35	Average 48	Poor 11		
Covers	Enough 72	Not enough 19			
Food	Good 14	Average 46	Poor 28		

13. Is there anything you feel should have been on the "What to bring list" that was not on there? Sample responses

More changes of socks
More paper and pencils
alarm clock
Warm P.J.'s
A hat for the cave

14. What advise would you give the fifth grade in order to better prepare them for camp? Sample responses

Don't expect everything
Landsite beautiful, clean cabins fun to sleep in
Go to the nurse right away if you think you have poison ivy.
Be prepared to have fun and be moving all day long
Don't try sneaking out-no chance

15. Write some general comments on what you liked and disliked about camp? Sample response

Likes	Dislikes
Bedtime I was tired	Lock on bathroom door
People	Not enough free time
How friendly everyone was	Setting and cleaning tables

16. Your opinion of the evening activities Sample responses

First night not fun
Could have been better
Lousy
Best part of camp
Great

#10- List in order of preference how you like the activities

	1	2	3	4	5	6	7	8	9	10	11	12
Water Enviroment	2	3	7	10	9	7	14	16	11	10	3	7
Spillway	20	14	12	22	4	10	4	3	1	2	2	1
Tracks	2	2	8	1	11	8	17	13	8	11	7	6
Water Wheel	4	12	12	12	17	17	5	2	6	4	3	1
Creative Dramatics	6	8	4	3	11	7	6	6	11	8	11	12
Meadow Study	-	-	-	3	4	3	7	13	14	13	25	13
Cave	27	15	19	8	4	7	6	2	4	3	-	1
North-South Slope	5	5	2	13	14	2	10	8	9	12	8	12
Arts and Crafts	4	10	11	8	11	15	6	9	8	5	2	6
Limestone Geology	-	-	1	3	4	5	9	10	14	14	17	19
Archery	28	25	17	6	7	4	4	3	1	3	-	-
Economic Geology	-	1	3	7	6	11	9	12	7	10	18	10

APPENDIX I

RECEIVED
OCT 3 1972
TITLE III, ESEA

ENVIRONMENTAL ECOLOGICAL EDUCATION PROJECT

TROUT LODGE

PRE-POST TEST

1. Which of the following are two ways in which folklore has been passed through the years?

   a. by word of mouth
   b. by airmail
   c. by digestion
   d. by art objects

2. Select two reasons why folklore of Miles Standish being in this area is not true.

   a. he never really lived
   b. he died in Massachusetts 1656
   c. Ferdinand VI reigned after Standish's death
   d. folklore never has any truth to it

3. Circle the statements that best describe the conditions of a slope.

   a. gentle slopes usually have more vegetation than steep
   b. steep slopes usually contribute to erosion
   c. slopes can be man-made or natural
   d. slopes always have cedar trees on them

4. Circle the statements that explain the effects soil compaction have on slope.

   a. the firmer the soil is packed the less water it will hold
   b. the quantity of plants growing on a slope depends on whether the soil is packed firmer or looser

5. Circle the terms that are used in archery.

   a. casting
   b. nocking
   c. bow
   d. ham string
   e. cock feather

6. Circle the two best answers.
   The most important parts of creative dramatics are to

   a. have a stage to act on
   b. use you imagination
   c. make a lot of props
   d. become involved in what you do

7. The spillway

   a. allows excess water to leave the lake without breaking the dam
   b. keeps the fish from escaping during highwater
   c. is a part of the dam
   d. is made of dirt

8. What do you need to know to measure the velosity of the waterflow?

   a. time
   b. distance
   c. gallons
   d. color of bobber

9. There is water in the air that is in the form of invisable vapor. When the air is hot it can hold _____ (more or less) of the invisable water vapor.

10. Match the weather instruments in column A with the words column B that best describe what they do.

A	B
____ thermometer	1. used mainly to forecast what the weather will be
____ sling psychrometer	2. to read the temperature
____ barometer	3. to determine the mositure in the air (relative humidity)

11. The gravestones in the two cemeteries are mostly made of

   a. marble
   b. granite
   c. wood
   d. limestone

12. Some of the gravestones have no marking on them. This is because

   a. these are unknown soldiers
   b. slaves buried with their master
   c. babies that died

13. Studying tracks is important because

   a. many are found in fossil form and tell about the past
   b. we can study the animal even when we can't see it
   c. we can determine the color of the animal
   d. man can learn about the habits and ways of animals

14. Water in Sunnen Lake comes from

    a. an underground spring
    b. water draining off the hills
    c. a hose we turn on every morning
    d. a river

15. Extremely different animal and plant communities can be found on different hillsides at Trout Lodge because

    a. the sun shines down on the hills at different angles
    b. there is more soil on some hillsides
    c. some hillsides get hotter than another
    d. it rains more on one side of the lake than the other side

16. Place the letter of the correct community in each blank.

    a. desert community
    b. pond community
    c. forest community
    d. tropical community

    A hillside that is facing north at Trout Lodge is a _____,
    but the hillside that is facing south is more like a _____.

17. People often move to or settle in an area because of the money that can be made by digging minerals out of the ground. What are some minerals that brought people to this area. Circle your answer or answers.

    a. gold
    b. iron
    c. lead
    d. uranium
    e. barite
    f. copper
    g. steel

18. What were some of the bad effects that occurred when land was completely cleared of trees for the timber industry.

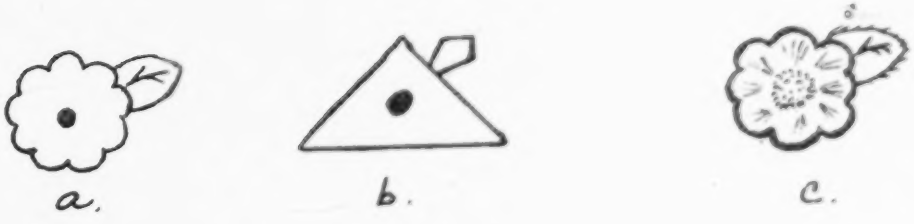
    a. the farmers could not grow crops well on this cleared land
    b. erosion occurred
    c. earthquakes began
    d. because all trees were cut down, the timber company had no resource to make money

19. Choose one and place in blank.

granite
lead
limestone
pipe iron

The caves of this area were formed by the water disssolving the _____.

20. There are certain things that can make an art work more interesting as "texture". Circle the best example of "texture" below.



21. Select what describes how rocks erode (slowly break apart to form soil).

a. wind and water
b. the sun
c. plants

22. Rocks can be grouped in three ways, circle the 3 words that explain these groups

a. sandstone
b. igneous
c. sedimentary
d. horizontal
e. metamorphic

TROUT LODGE COGNATIVE - PRE-POST SCORES

Student No.	Pre	Post	Student No.	Pre	Post
1	16	44	51	19	42
2	13	41	52	17	36
3	19	43	53	19	44
4	13	40	54	11	34
5	21	47	55	14	42
6	8	32	56	10	28
7	14	38	57	12	36
8	17	43	58	17	41
9	18	42	59	24	49
10	20	47	60	31	50
11	16	41	61	16	43
12	13	39	62	24	48
13	19	49	63	10	33
14	12	42	64	17	38
15	12	39	65	14	43
16	9	36	66	16	41
17	26	50	67	16	38
18	11	33	68	21	44
19	16	41	69	23	50
20	16	47	70	13	39
21	31	50	71	19	37
22	23	48	72	17	41
23	14	39	73	13	37
24	19	47	74	18	42
25	22	44	75	18	41
26	15	38	76	15	36
27	12	34	77	12	40
28	10	37	78	14	45
29	16	44	79	11	39
30	15	41	80	16	47
31	15	41	81	20	46
32	22	43	82	24	48
33	16	38	83	17	41
34	12	39	84	19	44
35	20	50	85	16	42
36	21	48	86	22	47
37	16	34	87	27	50
38	9	31	88	21	45
39	16	43	89	19	39
40	9	33	90	23	50
41	31	49	91	9	41
42	15	43	92	28	50
43	28	50	93	16	44
44	21	41	94	13	41
45	13	33	95	21	46
46	14	39	96	17	41
47	19	34	97	25	49
48	23	44	98	19	42
49	12	31	99	14	37
50	22	38	100	16	39

APPENDIX J

PARKWAY SUMMER PROGRAM FOR HANDICAPPED

Log of Activities

Perceived an animal and wihtout using a pencil, tore from construction paper animal perceived. Then wrote name and wore as a name tag.

On paper listed or drew things they expected to see outside on the ground or in a wooded area.

Went outside and collected wooded area litter and looked at all things around them.

Using construction paper and litter collected made a collage.

Using construction paper drew a game board. Each student made his own ribbon with name out of construction paper to use on the game board.

Collected seeds around parking lot: onion, garlic, curly dock, barley, grasses, venus looking-glass, and pepper grass.

Separated seeds, identified and labeled them, ready for planting.

Brought in hickory leaves, identified, shagbark and mockernut.

Brought in sumac, and identified.

Collected sassafras roots for tea.

Introduced community of living things. Observed living things in a wooded area at Hanna Woods.

On game board matched written word with objects found outside; acorn, nail, walnut, hickory nut, and feather.

Students moved on game board one block for each correct identification.

Collected litter for mobile construction - bark, nuts, rocks, twigs, sticks, cicada shells, wood, scraps, seeds, etc.

Sketched complete mobile layout, then began construction.

Identified three feathers and mounted.

Washed sassafras roots.

Observed trees, plants, animals as part of a community.

Placed seeds on wet paper towels to germinate.

Matched word with object on game board.

Made sassafras tea.

Continued mobiles.

Completion of mobiles.

Gameboard

Watered seeds

Drove through woodee area, introduced woodland trail.

Listed for a woodland community booklet all plants and animals observed in the woods.

Made booklet cover - leaf, wood, brick rubbings, on white paper using crayons.

Drove carts through meadow and introduced this community.

Planted seeds and placed in window.

Matched object with word - game board.

Using sense of touch, students reached hand into bag and without looking, named object. Used two bags with 7 - 8 objects in each bag. Points were given and spaces moved on game board.

Increase awareness of similarities of characteristics - used classification sheets on birds, reptiles, flowers, geometric shapes, and spiders.

Observed Gerbil community and fed them.

Each student made construction paper folder to carry things home in on Friday (last day).

Discussed food web. Students constructed on verbally of all things seen in the 98 acres.

Again discussed non-living and how they can affect living and othe non-living.

Similarities among leaves. Set up own classification system. Using various characteristics; shapes, size, and toothed.

Used sense of feel to describe rough, smooth, paper or leathery.

Collected and observed crinoids and coral from rock layers.

Collected rocks from creek bed.

Observed and classified a turtle.

Identified using "Golden Nature Series":

Mayfly
Dragonfly
Mosquito
Butterfly
Moth
Ant
Egg Cases
Pupa Cases (cacoons)

Looked for spider webs. Had a poor time finding good ones to spray. Captured web on black construction paper, sprayed with hair spray to preserve.

Decorated soup cans containing tree twigs. Hung wooden strips on the twigs.

Each student made a name tag from cedar wood. Wood burned name and decorated the back with thing or things most liked at 98 acres. Cut lacing and made necklace type name tags.

Observed and discussed community -

Meadow
Woodland
Pond

Discussed living things in a -

Meadow
Woodland
Pond

Discussed things dependent upon other things - home, food, and protection.

Students drew communities.

Presented trees to High School students and Project Director.

PROJECT STAFF OBSERVED PRE - POST EVALUATION OF HANDICAPPED STUDENTS

At the beginning of the summer program the Educable Mentally Handicapped students had a very poor, if any, perception of factors in a natural community and lacked skills in observation. Co-ordination was difficult for many students so carrying field equipment added to their handicap at first. They also had difficulty with the concept of a community.

Toward the end of the program the greatest area of improvement for the EMH was observation skills. Through repeated emphasis on use of all the senses to make an observation, most students showed marked improvement in this area. Relating living things; plants to animals and animals to plants mostly for purposes of a home and maybe food, showed their improved perception of a community. Also they were able to locate more non-living factors in the environment than they were aware of earlier.

The Orthopedic Handicapped students at the beginning were able to perceive living and non-living environmental factors in a community but lacked comprehension of the interrelationships of these factors. Also they lacked first hand observations of an out-of-door environment. This was evidenced by their expressed discomfort at being out where it was "hot and buggy". They wanted no crawling animal near them.

Soon the Orthopedic Handicapped students adapted to being out-of-doors and even held leaves with insects on them. The concept of a food web relating producer, consumer, decomposer and non-living material was comprehended and some students were able to perceive this relationship in more than one community. The most improvement seemed to be in adapting to being out-of-doors and enjoying it.

August 15, 1972

Dear Mr Abbott,

This is just to let you know that I think Parkway's Environmental Awareness Program has been a tremendous help to Jeffrey and Jenny

It seemed to improve them so much just to a lot which is their main problem. They had to talk to several people in the group and went to great length to let the teacher know what the were saying without ever getting frustrated. Also just having something to talk about stimulated their speech. Most of the afternoon they would tell me what they had done in school. Every day I pushed them up there was something more to see.

I feel that everyone who helped in the program deserves a big hand.

Sincerely,

(Mrs) Jean Abbott

Jean Marie Abbott
[illegible]
Chesterfield, Mo. 63017 Ph 434-5403

July 30, 1972

Mr. & Mrs. Warren Hinderer
364 Sorrento Dr.
Ballwin, Mo. 63011

Mr. Verlin Abbott, Director of EEK Project
455 N. Woods Mill Rd.
Chesterfield, Mo. 63017

Dear Mr. Abbott:

We think the Parkway environmental summer program was a very benificial project for the handicapped children in our Parkway district.

Our best judges of the programs success is our own children's enthusiasm to get to Hanna Woods School every morning.

We thought the emphasis on nature study was a welcome diversion from the usual "Arts and Crafts" programs. Lori remarked more than once about all she has learned and Donna amazes us with the knowledge she has picked up from the program.

The trips to the woods and the mobility afforded by the electric carts was enjoyable for the children and prevented "inside-itis" from setting in.

All the staff were enthusiastic and pleasant and our kids loved to be around them.

We guess one of the most attractive features for us was the convenience of having it right in our own district. Last year Lori attended the day camp program conducted by the Easter Seal Society in conjunction with the Special School district, but because of the distance involved it was a hardship to get her there every day.

We hope this will be a continuing program and that other recreational and educational opportunities will be formulated for the handicapped children in this district such as home-economics, winter swimming, music, etc.

Thank you and all the staff for your time, efforts and concern to make Lori and Donna's summer more enjoyable and meaningful than would otherwise have been possible.

Sincerely,

Dorothy M. Hinderer
Dorothy M. Hinderer

Warren W. Hinderer
Warren W. Hinderer

July 28, 1972

Mr. Verlin Abbott
Director of EEE Project
455 N Woods Mill Rd.
Chesterfield, Mo. 63017

Dear Mr. Abbott,

My son, Curtis, attended the summer ecology class for special children at Hanna Woods School. It was a joy for me to see my son enjoy and learn so much. Curtis is capable of learning a great deal if presented to him at a suitable rate and in a manner where pressure is kept at a minimum.

This class was the best summer program my son has ever attended. He is unable to keep up with the regular children at the public park programs and many of the private programs for special children are either to expensive, to far from home or they are geared to the level of the more severely retarded child.

This program has deffinately filled the void. It is much appreciated by many and I hope to see it repeated or a similar program next year.

Sincerely,

Shirley Hemman

July 28, 1972

Dear Mr. Abbott,

Our eleven year old Jeff attended the Environmental summer program at Hanna Woods School, and he happily enjoyed a wonderful learning experience. No other summer program he attended has been so much fun and taught so many things at the same time.

This study of nature program is unique, judging from our experiences in retarded children's summer activities. No other program has shown the appreciation for a retarded child's ability to learn about the world of living things or his ability to appreciate all that is in their environment. The very fact that this program was established shows concern for "special" children, and the excellent teaching staff plus a carefully

planned program are evidence of respect for the learning ability of the children.

I believe these children will see so much more of their world as a result of this program. I believe they will have a better self image as a result of the respect shown for their ability to study their environment.

In order for more children to benefit from such a first rate program, I would like to suggest the same program of one month be offered for two or possibly three periods. I would urge Special School District to supply all of the Parkway District's names of students, so all could be reached.

This program was the highlight of Jeff's summer. He has outgrown Camp Foco, a day camp in Kirkwood which is geared to more severely retarded children. He is unable to go to regular summer day camps or other programs. This was an unexpected summer program which I believe fills a need for children like Jeff, and it was a very high caliber program.

Sincerely,

Mrs. Elizabeth M. Powell

Sept 22, 1972

Dear Mr. Abbatt,

My little boy attended the Parkway Environmental summer program for the handicapped and I must ~~say~~, we have never been so pleased. Children are learning, and yet able to be outdoors and experience lifes activities It was especially nice to have men instructos and helpers. this seems very impotant.

I hope you notify parents beforehand, through the schools - I only heard from word-of-mouth.

Please continue this program and extent it if possible. Perhaps 9-12 would be better hours.

this was a job well done.

Sincerest thanks

Mrs Reissie